Chapter 15
Technical Analysis

This chapter describes the 1) breadth of data and information used to prepare this Plan, 2) analyses of that data and information, 3) data collection and management procedures, and 4) how stakeholders contributed to and have access to this water-management-related information. The Plan is intended to have a 20-year planning horizon; therefore, information was gathered and analyzed to illustrate water management needs over that time period when possible.

This section also identifies data needs in the region and describes how updates of data and documents will be shared. An online program known as the Sacramento River Watershed Information Module (SWIM) and the CABY Website both expand the CABY region's capacity for data management and accessibility.

15.1 Technical Information

15.1.1 Background

Over the course of Plan preparation, extensive data gathering was conducted by numerous individuals preparing this document, including the Project Team, Technical Advisory Committees, Work Groups, and the Planning Committee (PC). This includes maps, reports, time series data, and other information used to identify problems and opportunities and to characterize conditions in the CABY region. Extensive information on climate change and attendant information on fire and fuels was gathered and analyzed to characterize vulnerabilities and adaptation to climate change. These documents, in addition to several updated and/or new planning documents produced in the last four years have contributed data updates, priorities, projected scenarios, and have identified issues and data gaps. Table 15-1, at the end of this chapter, lists the primary sources of data used; see Bibliography for a full listing of references.

15.1.2 Analysis

Specific methodologies explaining how Work Groups and the PC conducted their respective analyses are contained in respective chapters and appendices. However, four areas of inquiry deserve special mention because the CABY PC and/or its committee delved into the following topics to a greater degree, and then used the information available to better understand water management needs and strategies relative to these topics during Plan preparation.

15.1.2.1 Western Placer Creeks (WPC) Fish

The region offers important habitat for restoring historical runs of native anadromous fish. The PC's decision to focus on fish access below regional dams came out of the examination of several documents

as well as expert opinion. The Lower Yuba River Accord, a process and suite of documents completed in 2008, was headed by the Yuba County Water Agency and included topics of fish habitat, passage, species diversity, and the seasonality of essential streamflow patterns. These documents were created by a group of diverse stakeholders, and are based on federal, State, and peer-reviewed scientific data. As a complement to the Lower Yuba River Accord work, the National Marine Fisheries Service Biological Opinion (2009) on the presence of anadromous fish in the Sacramento Valley contributed to these discussions. This information provided a foundation on which the Western Placer Creek Work Group could focus its issues and objectives development for habitat restoration and fish recovery.

15.1.2.2 Climate Change Assessment

The climate change assessment conducted by the CABY Technical Advisory Committee (TAC) represents a significant number of primary data and analyses, including the MC1 vegetation modeling described in Appendix G. As discussed in Chapter 11, Climate Change, the TAC identified early on that creating a foundational review of literature relevant to climate change in the CABY region would be essential to enhancing regional understanding of on-the-ground climate change effects. The documents identified in this analysis consisted of approximately 80 percent peer-reviewed journal articles and 20 percent federal, State, and locally produced documents. Each item considered for use in the literature assessment was reviewed for quality within the TAC and became part of the IRWMP bibliography. In this way, the determinations of vulnerability and, therefore, adaptation strategies and priorities, were based on a foundation of material assessed for quality in an 'outside' arena, such as academia and/or the public sector. Information was used to identify regional issues, vulnerabilities and adaptation strategies, and objectives.

15.1.2.3 FERC Data Management to Aid Data Analysis

The CABY region includes five major hydropower operations, most of which have completed relicensing over the last decade, for which vast amounts of data have been generated. Implementation of relicensing processes often results in additional data collection and analysis as well; such documents will be a source of updated information for the region.

The CABY membership identified the FERC documents as adequate for developing the IRWMP because the collection of information represents the current conditions in a fair, relevant, and balanced way. Represented in the source materials are documents from the U.S. Forest Service and other federal agencies, the member water agencies, various environmental advocacy groups in the region, and internationally known, peer-reviewed scientific journals. In addition, members are confident in the scope of the suite of documents. Document recruitment was announced during early PC meetings, and calls were made to each member organization to query additional and/or updated documents.

FERC relicensing data and technical analyses provided background for several chapters of this Plan and helped the PC and its committees to identify issues, objectives, and implementation projects.

15.1.2.4 Greenhouse Gas (GHG) Analyses

GHG analyses were calculated for Tier 1 projects in this Plan to compare project alternatives and mitigate emissions under project design (see Appendix G). To determine the average annual total GHG emissions, short-term construction emissions were divided over the life of the project. The total construction activity emissions are the sum of the emissions from the construction equipment, from

transportation of construction workforce, from transportation of construction materials, and the construction electricity emissions.

Emissions from construction equipment were calculated by evaluating each equipment type. The maximum number of a specific equipment types per day was multiplied by the total operation days of that equipment to find the total operation hours. The fuel consumption per hour was determined either by a table from the California Air Resource Board, or by the sponsor of the project if they were familiar with the equipment. The total fuel consumption was calculated by the product of the total operation hours and fuel consumption per hour. Finally, the total CO_2 equivalent emissions were determined in metric tons by multiplying the total fuel consumption by the CO_2 emissions per gallon diesel which is 0.010, (from the World Resources Institute-Mobile combustion CO_2 emissions tool[1]). This process is repeated for each equipment type. The sum of these numbers is the total CO_2 equivalent emissions for the construction equipment.

The emissions from transportation of construction workforce were calculated next. The total miles traveled were determined by the product of the average number of workers per day, the total number of workdays, and average distance traveled (round trip). The total fuel consumption in gallons of gasoline is determined by dividing the total miles traveled by the average passenger vehicle fuel efficiency, (which is provided by the United States Environmental Protection Agency). This number is multiplied by the CO_2 emissions per gallon gasoline, (0.009) to obtain the total CO_2 equivalent emissions in metric tons for the transportation of construction workforce.

The emissions from transportation of construction materials were subsequently calculated. There are two trip types: delivery and spoils. The total emissions were calculated the same way for both. The total miles traveled are determined by the product of the total number of trips and average trip distance. This number is then divided by the average semi-truck fuel efficiency to find the total fuel consumption, and then multiplied by the CO_2 emissions per gallon diesel to find the total CO_2 equivalent emissions in metric tons. The sum of this number for the two trip types is the total emissions from the transportation of construction materials.

The construction electricity emissions are calculated simply by multiplying the amount of electricity needed in mega-watt hours by the amount of CO_2 per mega-watt hour, which is 0.310 (provided by eGRID2010[2]).

The total construction activity emissions are the sum of the total of emissions from construction equipment, transportation of construction workers and materials, and construction electricity. The average annual total GHG emissions are finally determined by the quotient of the total construction activity emissions and estimated project useful life in years.

[1] World Resources Institute. 2006. The Greenhouse Gas Protocol: Designing a Customized Greenhouse Gas Calculation Tool. June 2006. Available from: http://pdf.wri.org/GHGProtocol-Tools.pdf

[2] U.S. Environmental Protection Agency. 2010. The Emissions & Generation Resource Integrated Database for 2010: (Egrid2010) Technical Support Document. Prepared by: E.H. Pechan & Associates, Inc. December 2010.

15.2 Data Management

15.2.1 CABY Data Collection Policies and Procedures

It is CABY's policy that the person or entity responsible for data collection and project implementation is also responsible for reporting the data obtained. However CABY's policy is also to offer all members assistance, if needed, in implementing a project or in addressing a State mandate. This is available through CABY staff or a member organization.

One challenge with historical data is its format: much of it exists in hardcopy that does not readily allow for comparison, analysis, and distribution. Also, much of the available digital information (e.g., soils, topography, streamflow, and rainfall time series data) from local, State and federal sources is widely distributed throughout multiple databases and is not in compatible formats that can be easily integrated and analyzed. One of the principles CABY members have identified going forward is that historic information, while important, will not be updated to be compliant with current database standards and/or formats. This would be an expensive effort and CABY members would rather focus on future data points.

Long-term goals of regional data management are to:

- increase the staff efficiency and effectiveness;
- reduce cost of long-term information management;
- provide a one-stop shop for basin-wide water-related data (see SWIM description in next section); and,
- provide the highest level of support to member entities.

CABY data, information, processes and communications are and will be shared under two primary venues: the CABY website, and the SWIM tool that links to State databases. The functionality of the CABY website to serve as a data and communications portal was enhanced as part of this IRWM planning process. As well, a guide was created for State database reporting. One objective of this guide (see Appendix G) was to ensure that CABY members were made aware of how their organization's data and information could be helpful to other stakeholders. A second objective was to describe how to access additional information on environmental and resources status throughout the state. The data guide serves to direct CABY members to the appropriate State databases for reporting information.

15.2.2 Data Collection, Management, and the Sacramento River Watershed Information Module (SWIM)

In 2007, the CABY PC began identifying ways to coordinate data collection and submittal with State and regional databases. The diversity of CABY stakeholders creates a variety of data types and methods of collection, which further complicates the coordination of reporting. The SWIM provided a solution to this challenge. The SWIM system was first developed for use in far northeastern California by the community college system and after being defunded was taken on and expanded by the Sacramento River Watershed Program (SRWP). SWIM allows users to load their own data into the online data library through either downloading a digital file or 'pointing' to the online location of the file. Immediately upon loading information into the SWIM digital library, it is also submitted to the California Environmental

Information Clearinghouse (CEIC),[3] developed as part of the California Environmental Resources Evaluation System (CERES). It is important to note that while the Cosumnes River is not geographically considered part of the Sacramento River watershed, CABY worked with the SRWP to include this watershed so that the CABY region could be a complete feature within the tool.

One of the more valuable elements of the SWIM tool is that it allows the user to geo-locate the data and/or document by giving it a GIS point. This step immediately adds the data or document to the SWIM digital atlas. After being loaded into the digital atlas, SWIM allows users to identify the document, data, or project by turning various GIS layers on and off within the tool itself. This allows use of the GIS data to all online users, even those without access to GIS software.

SWIM includes three major components:

1. Digital Atlas: The SWIM digital atlas includes interactive, web-based GIS maps that allow web users to explore the Sacramento River watershed. Users can add their own data layers, edit and highlight features, and save copies of their developed maps to print or share digitally. The Atlas data layers are extractable for use in GIS software or on Google Earth.
2. Geofinder: This map-based search tool allows users to browse water- and resource-related documents in the Sacramento River Watershed Program's Resource Library. In addition to providing access to these resources, the Geofinder also provides a portal to the CEIC's statewide data catalogue. All of the information submitted to the SWIM tool also becomes a data point in the CEIC's database.
3. Resource Library: This is the heart of the SWIM tool: a publicly accessible digital library for water- and natural resource-related information within the Sacramento River watershed. Authorized users can upload documents, photos, or other information, tag it on a map, and describe their project or data using forms. This information is archived on the Sacramento River Watershed Program website. New library entries are processed nightly, and the abstracts are sent to the CEIC database and accessible through SWIM's Digital Atlas and Geofinder.

CABY anticipates that to keep the SWIM data management system current, a call for new and updated documents, reference materials, and datasets should be announced annually along with a short tutorial and reminder on using SWIM. CABY staff will remain available for assistance in the loading and stakeholder use of the tool. In the end, stakeholders remain responsible for updating and loading their own information.

15.2.3 How Stakeholders Contribute and Share Data

Stakeholders are able to submit information to data management systems in two ways: To upload data (with PC permission) to the CABY website (www.cabyregion.org/), and to the SWIM system. The process of contributing data to the SWIM system is simple and straightforward. A user first needs to create a user account, accessible through http://swim.sacriver.org/. After gaining access, the user can then add a personal profile and/or the profile of their organization. They can also add 'pages' (documents and data) and GIS layers to the SWIM library interface.

[3] The Catalog is a repository of information about environmental data resources in California. Its primary purpose is to provide users of environmental information with data that will help them identify existing resources, evaluate them, and simplify access to the information resource data. The Catalog may be viewed as a 'Yellow Pages' of environmental information by indexing and organizing metadata that facilitates identification and access to the data.

Part of the IRWMP update process includes a training of all project sponsors and interested CABY members in the use of SWIM. This ensures that stakeholders will be able to use the tool, in addition to populating the tool with information. Training stakeholders to use the tool also increases regional capacity to complete maps for grant applications and planning purposes, and allows all stakeholders to view data relevant to the watershed. The tool covers the entire Sacramento River watershed (and includes the Cosumnes River watershed), creating the opportunity to research projects and programs completed or in process throughout neighboring IRWM regions.

When stakeholders are interested in retrieving information from SWIM, they can log on to the tool and either visit the map of the watershed, clicking on boxes to "show layers" including project locations, 303(d) sites, planning documents, or other relevant information, or they can visit the library and type in key words to identify the documents relevant to their search. SWIM does not offer blocking of specific information: If an entity does not want something publicly available, this is not the place to share. In cases of sensitive information, it is likely that members would identify a webpage on the cabyregion.org website to host behind a firewall. 'Qualifying' members would then be able to sign in to view the information. This process has been used in other regions and could be easily implemented in the future.

15.2.4 DMS Support

The SRWP has made a commitment to keep the SWIM tool active and updated. The tool has been upgraded in the past year (2012), making it more user-friendly than previous versions. Also, a photo-management capability was added to the tool to enable stakeholders to load and geotag photos of projects, habitat, wildlife, or anything relevant to regional resource management. In addition to technical support, the SRWP staff acts as a gatekeeper for the information and photos added to SWIM and for users making use of the tool.

15.2.5 Responsibility for Maintaining Data

Relevant information must be uploaded by stakeholders. It is expected that the PC will keep the website current for matter pertaining to CABY events and planning, and all project sponsors will add the information relevant to their particular projects.

15.3 Data Needs and Gaps

In the process of identifying data and documents, the PC noted two major gaps in regional knowledge: 1) the region's groundwater resources and how/whether the fractured rock aquifers are connected and might respond to climate change, and 2) the occurrence, behavior, risk, and future costs to the region of catastrophic fire.

15.3.1 Groundwater

One important and persistent gap in the CABY region is the understanding of groundwater. Underlying the entire region is a complicated network of granite rock with fissures that hold water; this is called a "fractured rock" aquifer. No water purveyor in the region uses groundwater as a source for public supply, but there are many private residents who reply upon groundwater as their only water source. Fractured rock is known to be unpredictable in terms of where water might be found (including both well depth as well as surface placement) in addition to how it moves through the fissures. Extended drought has caused problems in the past with regard to supplying water to households whose wells run dry for a period of time.

15.3.2 Climatic Effects on Catastrophic Fire

CABY members identified the need to better understand the future of fire behavior and risk throughout the region, especially under a changing climate regime. It projected that both the occurrence and severity of fire will increase (see Chapter 11), but not well known is how the hydrology of the region's forestland will respond. To address part of this data gap, CABY's Climate Change Technical Advisory Committee conducted an extensive literature review as part of its vulnerability analysis. The effects of fire on the ecosystems and hydrologic cycle in the CABY region is something that will be taken into account as CABY continues both its climate change work and coordination with land use planning entities. In general, monitoring data are difficult to come by. Due to cost and other agency demands on the U.S. Forest Service, post-fire data collection is generally nonexistent. While CABY has a fire module ready-to-go as a component of the region's WEAP model, it has not been calibrated due to the lack of on-the-ground data and information.

15.3.3 CABY's Federal Energy Regulatory Commission (FERC) Information

While FERC relicensing processes generated substantive data relative to this Plan, new FERC data will need to be managed for accessibility to CABY and surrounding watersheds. CABY has identified a need for a data management system beyond the SWIM tool that would allow for shared access in a categorized way to the wide array of FERC maps and data. Within the CABY region, this data and a well-designed system will provide long term value because they will:

- improve the understanding of the conditions;
- support public education and generate public awareness and support for proposed projects and programs;
- reduce risk and uncertainty in decision-making by land use and water agencies;
- facilitate sharing of data between local, State, and federal agencies; and
- increase the cost-effectiveness and utility of the data collection and management efforts.

Members also believe strongly that the FERC information and libraries available on water agency and power provider websites are best accessible in one place. Accordingly, CABY stakeholders applied for technical assistance funds from DWR to implement a FERC information-sharing system. Although there were no available funds, CABY will pursue funding for this in the future.

15.4 Quality Assurance of Datasets and Information

Technical information and datasets were assessed initially for validity. Generally, if the data or documents were accepted by an outside agency or other entity as being satisfactory, for instance peer-reviewed studies and planning documents having undergone public review, the items were judged of adequate quality for use in the CABY IRWMP Update.

Since the first CABY meeting in January 2006, CABY members have stood by their standard of rejecting data generated by an entity with an obvious financial stake in an outcome, and/or data that runs contrary to generally accepted findings. In addition, the CABY membership has always enforced that disagreement with facts must be backed up by data supplied by the parties differing in viewpoint. These policies have served CABY well.

Some of the more scientifically-based analysis methods for the key documents used in this 2011-2013 IRWMP Update may be found below, in addition to a description of how they have aided the PC in understanding the water management picture through the planning horizon. The CABY IRWMP was first written in 2007, and references in this update built on the original significant reference library.

Table 15-1
A Summary of Primary Studies and Data Sets Used in Preparing the IRWMP

Name of Study/Data Set	Use in the IRWM Plan	Other (e.g., status of data, certainty of data/analysis, relevance to other sections)
Water Quality		
California Environmental Protection Agency, Central Valley Regional Water Quality Control Board. *The Integrated Report - 303(d) List of Water Quality Limited Segments and 305(b) Surface Water Quality Assessment.* Sacramento, CA; State of California. 2011. http://www.swrcb.ca.gov/centralvalley/water_issues/tmdl/impaired_waters_list/index.shtml	These analyses were used to characterize the nature and status of water quality impairment for stream reaches	These data are updated, so should be consulted periodically
PCWA FERC data and studies	important water quality information, especially used to enhance understanding of mercury methylation the region	Includes a variety of statistical, biological/scientific, economic, hydrological modeling, and physical monitoring, frequency and occurrence of threatened or endangered species, and occurrence of special-status plants in the region
Water Demand		
Population estimates as described in the Region Description (from CA Department of Finance) and water use as estimated at purveyors' treatment plants	These data points were used to estimate water demand and to project demand with future population estimates	These data should be reviewed periodically and as implementation projects are completed
Urban Water Agency updated 2010 UWMPs for EID, GDPUD, PCWA, NID	Used to project water needs the CABY region	Current and future water use by urban water agencies in the region; monitor for updates
Water Supply		
Urban Water Agency updated 2010 UWMPs for EID, GDPUD, PCWA, NID	Used to assess/understand the state of supply for the larger retail water purveyors in the CABY Region	Used by urban water agencies in the region; monitor for updates
Flooding		
FEMA 2005. Zone A – Areas subject to inundation maps. Available from: https://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1	These data were used to understand both infrastructure and climate vulnerabilities and to determine data gaps for flooding	

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Natural Resources		
California Department of Fish and Game, Biogeographic Data Branch. *California Natural Diversity Database*. Sacramento, CA. July 2011. Available from: http://www.dfg.ca.gov/biogeodata/cnddb/	These data were used to identify species of special concern as identified by the State	These data are updated, so should be consulted periodically
U.S. Fish and Wildlife Service. *Critical Habitat Portal*. Washington, D.C. 4 August 2011. Available from: http://criticalhabitat.fws.gov/crithab/	These data were used to identify areas of critical habitat as identified by the U.S. Fish and Wildlife Service	These data are updated, so should be consulted periodically
National Marine Fisheries Service. Biological and conference opinion on the long-term operations of the Central Valley Project and State Water Project (June 4, 2009)	Results directly relevant to the CABY Region include the identification of the Western Placer Creeks as suitable habitat for anadromous migration and spawning	
Population		
California Department of Finance. *Population Projections by Race/Ethnicity for California and Its Counties 2000–2050.* Sacramento, CA. May 2012. http://www.dof.ca.gov/research/demographic/reports/projections/p-1/.	These statistical analyses were used to project future population and demographics and, subsequently, water demand and potential land use changes.	These data are updated, so should be consulted periodically
U.S. Census Bureau. *Census 2010*. Washington, D.C. 2011. 15 August 2011. Available from: http://2010.census.gov/2010census/index.php	Statistical analyses were used to project population and demographics and, subsequently, water demand and potential land use changes	These data are updated, so should be consulted periodically
Socioeconomic		
PCWA FERC data and studies	Used to enhance CABY members' understanding of the region and to update the region description in the IRWMP	Includes a variety of statistical, biological/scientific, economic, hydrological modeling, and physical monitoring, frequency and occurrence of threatened or endangered species, important water quality information (especially regarding effects on mercury methylation), and

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		occurrence of special-status plants in the region
Wild and Scenic Rivers Status studies from Tahoe and Eldorado National Forests	List of streams and rivers recommended for federal wild and scenic status, used in the Region Description	Scientific, botanical, biological, and other analyses to determine suitability of protection
Land Use		
General Plans for Amador, El Dorado, Placer, Nevada, and Butte Counties	Used for population estimates, development projections, goals and objectives review and planning priorities	General plans are periodically updated
City Plans for Placerville, Auburn, Grass Valley, Nevada City, and Colfax	Used for development projections, goals and objectives review, and planning priorities	City plans are periodically updated
Sierra Nevada Forest Plan Amendment	Used for goals and objectives review and planning priorities	Forest plans are periodically updated
Land and Resource Management Plans for the Eldorado and Tahoe National Forests.	Used to evaluate development projections, goals and objectives review, and planning priorities.	Forest plans are periodically updated.
Climate		
The Natural Resources Agency, Department of Water Resources, Division of Integrated Regional Water Management. *Proposition 84 & Proposition 1E Integrated Regional Water Management Guidelines.* Sacramento, CA; State of California. November 2012. Available from: http://www.water.ca.gov/irwm/guidelines.cfm	Guidance for the Plan on aspects of climate to be discussed, strategies to be considered, and assessment of GHG emissions	Guidance for all Plan sections
Climate Change Scoping Plan: A framework for change. December 2008. Prepared by the California Air Resources Board for the State of California, Sacramento, CA. Available from: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.	Was most relevant when considering adaptive resource management strategies and GHG reduction associated with project development	
California Department of Water Resources. *Managing An Uncertain Future: Climate change adaptation strategies for California's water.* Sacramento, CA, State of California. October 2008. Available from: http://www.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf.	Provided a profile of the observed climate phenomena at the state level that have bearing on the region	

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California Natural Resources Agency. (2009). 2009 California Climate Adaptation Strategy. Retrieved from CAKE: http://www.cakex.org/virtual-library/1959	Proposes a set of recommendations for policy development to protect the state from the effects of climate change and generally focuses on GHG reduction strategies that may be relevant; used in the climate chapter	
Westerling, A.L. & Bryant, B.P. (2008). Climate change and wildfire in California. Climatic Change, 87 (Suppl 1), S231- S249	Key study indicating continued and increasing risk of fire in the CABY region under all climate change scenarios; used to assess regional vulnerabilities	Statistical, using projected climate change scenarios
Safford, H.D., M. North and M.D. Meyer. *Chapter 3: Climate Change and the Relevance of Historical Forest Conditions*, *Managing Sierra Nevada Forests.* Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Stations. No date. Available from: http://www.fs.fed.us/psw/publications/documents/psw_gtr237/psw_gtr237_023.pdf	Broad application of data from this study helped define regional climate trends and vulnerabilities/strategies	
Freeman, G. J. 2010. Tracking the impact of climate change on central and northern California's spring snowmelt subbasin runoff. Western Snow Conference 78:107:118. Available from: http://www.sierrainstitute.us/ALMANOR/Freeman_Climate_Change_and_Snowmelt.pdf	Used to examine the influences of and correlation between topography and rain shadow effect on climate impacts to reduced snowmelt, spring runoff, and sometimes total runoff for the water year	
Lenihan, J.M., et al. 2008. The response of vegetation distribution, ecosystem productivity, and fire in California to future climate scenarios simulated by the MC1 dynamic vegetation model. Climate Change 87 (Suppl 1): S215-S230. Output of potential natural vegetation for California (model simulations). Available from: http://www.enerty.ca.gov/pier/project_reports/500-03-58cf.html	Analysis of vegetation and effects on vegetation from climate change using modeled data. Used to help inform the climate vulnerability analysis about changing vegetation patterns and related habitat	Less certain because modeled data were used
Greenhouse Gas Calculations		
World Resources Institute. 2006. The Greenhouse Gas Protocol: Designing a Customized Greenhouse Gas Calculation Tool. June 2006. Available from: http://pdf.wri.org/GHGProtocol-Tools.pdf	Provided the formulae used to calculate GHG emissions from Tier 1 projects	

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U.S. Environmental Protection Agency. 2010. *The Emissions & Generation Resource Integrated Database for 2010: (Egrid2010) Technical Support Document*. Prepared by: E.H. Pechan & Associates, Inc. December 2010. Available from: http://www.epa.gov/cleanenergy/documents/egridzips/eGRID2010TechnicalSupportDocument.pdf	Used to calculate construction-related electric energy use emissions.	